9K317M Buk-M3, missile 9M317M

DATA AS OF 2017 (standard replenishment)
9K317M "Buk-M3" / "ZRK SD" complex, 9M317M missile
★★★★

Medium-range anti-aircraft missile system / SAM of the operational (army) level of air defense of ground forces. The complex is being developed by the V.V. Tikhomirov Institute of Instrument Making. The chief designer of the SAM is E.A. Pigin. The development of the SAM began in 1990 (*source - History...*). In December 1992, Russian President B.N. Yeltsin signed an order to modernize the Buk SAM (source).

Tests of the SAM with missile launches were conducted at the Kapustin Yar test site in 2005-2011. In 2006, information appeared that the complex was undergoing factory tests (source). According to the annual report for 2011 of the Almaz-Antey Air Defense Concern, state tests of the 9K317M SAM system with the 9M317M SAM were conducted in 2011 (source). In particular, a successful launch of the Reis target UAV was conducted on 14.12.2011 (source). According to data for 2012, state tests of the SAM system are ongoing (source), although it was later reported that state tests of the SAM system were successfully completed in 2011 (*source - History...*).

The missile of the 9M317M system was first shown at the international exhibition Defendory International - 2006 in Greece, as a SAM of the promising Buk-M3 system (source).

In September 2007, it was planned to accept the system into service in 2009 (source , source), but these plans were not realized. Based on the results of 2012, it was planned to start serial production of the complex in the first half of 2013 (source), but at the end of 2013, the media announced that the Buk-M3 SAM system was planned to be delivered to the Russian Armed Forces in 2016 (source). The first brigade set of serial Buk-M3 SAM systems was planned to be delivered to the Russian Armed Forces in 2016. As a result, in October 2016, the first division of Buk-M3 SAM systems was delivered to the Russian Armed Forces (source).

The 9M317M missile has been produced by the Dolgoprudny Scientific and Production Enterprise since at least 2006.

In the media and elsewhere, the complex was referred to as "RVZ SD" (apparently, "medium-range military anti-aircraft missile"), which is not official and actually exists.

Self-propelled launcher (SPU) of the 9K317M Buk-M3 air defense missile system with full-size and weight mock-ups of the TPK during testing at the Kapustin Yar proving ground (History of domestic radar. Moscow, Stolichnaya Encyclopedia, 2014).

Author: DIMMI Created: 29.12.2013 22:42:57 Comments: 37 READ THE FULL ARTICLE

BrahMos complex, SK310 / PJ-10 missile

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DATA FOR 2018 (standard update)
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ROC "Alliance"
BrahMos block I missile
BrahMos block II missile
BrahMos block III
missile SK-310A / BrahMos-A missile (aircraft)
★★★★

Anti-ship cruise missile / cruise missile for firing at ground targets. Analogue of the domestic cruise missile "Yakhont" / "Onyx" developed by NPO "Mashinostroyeniye" (OKB-52 V.N.Chelomey) produced and developed for various platforms by the joint Russian-Indian enterprise "BrahMos Aerospace Pvt. Ltd." (established on 12.02.1998). In 1999, work on the complex began in related design bureaus (for example, NPO "Iskra"). The missile model was first shown at the MAKS-2001 air show. Testing of BrahMos missiles began no later than 2001, and their joint serial production began in January 2004. The sea-based BrahMos missile in the anti-ship cruise missile version (for surface ships) was accepted into service with the Indian Navy in 2006. The delivery of land-based missile systems to Indian coastal defense units began in 2007.

It is planned to accept into service different versions of the missiles (by basing) - land-based (wheeled transporter with vertical launch container, accepted into service), air-based version (carriers - Su-30MKI and other aircraft of the Indian Air Force), a complex for ships (accepted into service) and submarines of the Indian Navy. The Indian side is engaged in the creation of the control system of the complex. Some components for the BrahMos missiles are produced by NPO Strela (Orenburg, missile production). The possibilities of joint production as of 2009 are estimated at 200 anti-ship cruise missiles per year (2005-2006 - 100 units per year). The complex is offered for export. Many characteristics are identical to those of the Yakhont/Onyx anti-ship missiles .

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Launch of the BrahMos block III missile at the Pokharan test site in Rajasthan, 18.11.2013 (photo - Indian Ministry of Defense via http://ria.ru).

Author: DIMMI Created: 05.09.2010 01:54:01 Comments: 61 READ THE FULL ARTICLE

BZHRK Barguzin (project)

DATA FOR 2017 (standard update)
BZHRK R&D "Barguzin"
★★★

Intercontinental ballistic missile (ICBM) / combat railway missile system (BZHRK). R&D on the creation of the BZHRK was started in 2012 and is being conducted by the Moscow Institute of Thermal Engineering (MIT). Until December 2014, it was discussed that the creation of the complex was possible either on the basis of the RS-24 Yars ICBM or on the basis of the RS-26 Rubezh ICBM or using the developments of the 3M30 Bulava intercontinental SLBM . But in December 2014, information appeared in the media that the complex would include ICBMs of the Yars or Yars-M type (source).

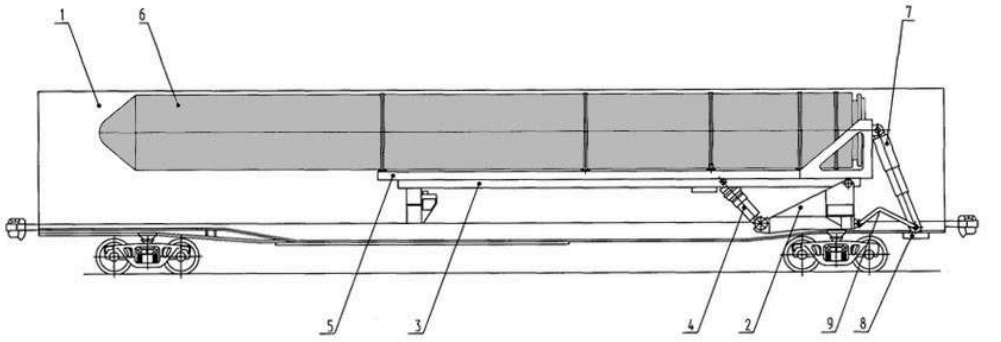
It is unlikely that the chief designer of the complex can be Yu. S. Solomonov , since in his speeches in the media he has repeatedly spoken out against the BZHRK as a class of missile systems. By 2020, it is planned to complete the R&D work, create and test prototypes of the BZhRK (according to plans from 2012). After 2020, the systems will begin to enter service with the Strategic Missile Forces (source).

On April 23, 2013, Deputy Minister of Defense of Russia Yuri Borisov stated that the preliminary design of the BZhRK is currently underway, and work is underway on technical projects (source). On December 18, 2013, the Commander of the Strategic Missile Forces, Colonel General Sergei Karakayev, reported that the preliminary design will be completed in the first half of 2014, but the final decision on the design of the BZhRK has not yet been made (source). As a result, the preliminary design of the system was completed at the end of 2014 (source). The media reported that as of mid-2015, the first stage of R&D work to create the system is underway.

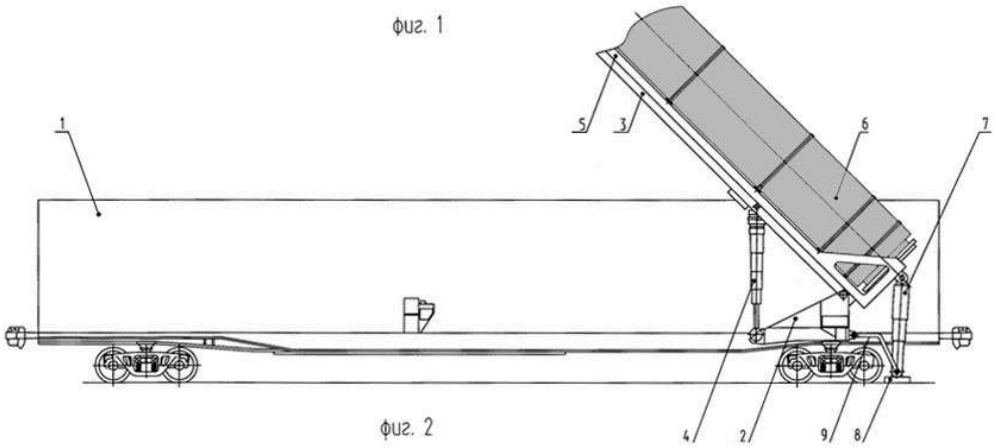
In December 2014, the Deputy Commander-in-Chief of the Strategic Missile Forces stated in the media that the development of the BZhRK could soon begin, and the Commander-in-Chief of the Strategic Missile Forces stated a day later that the new system was called "Barguzin". The development of design documentation began in 2015 and is planned to be completed in mid-2016 (source). However, later in December 2015, a source in the Russian defense industry told the media that due to the difficult financial situation, the work on creating "Barguzin" had been postponed for more than a year and would not be completed before 2020. On May 12, 2016, the media reported that "the design documentation has been developed, individual elements of the system are being created, but there is no exact date for its creation and adoption into service", with clarity on the date set for 2018 (source).

The deployment of the new BZhRK is expected to begin no earlier than 2018, and most likely in 2019 (source). at the end of 2015, the start date of the complex deployment was specified - 2020 (source).

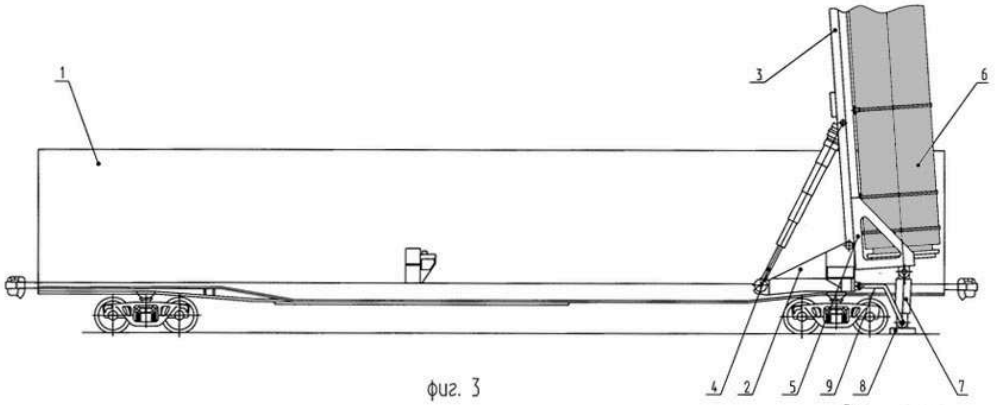
02.12.2017The media reported the closure of the BZhRK creation program (source). Probably for financial reasons, as well as due to inexpediency.



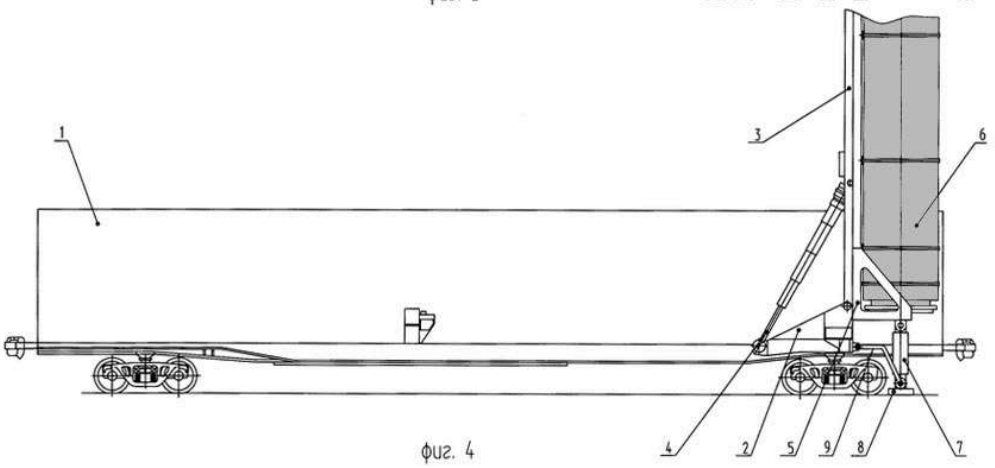
фиг. 1



фиг. 2



фиг. 3



фиг. 4

Illustrations for the patent of the Central Design Bureau "Titan" for a railway launcher (http://militaryrussia.ru via http://www.findpatent.ru).
The numbers on the diagram indicate: 1 - a railway car or platform, 2 - a fixed trunnion beam, 3 - a lifting boom, 4 - a boom lifting mechanism, 5 - a movable frame fixed to the boom with the possibility of longitudinal movement, 6 - a TPK with a missile, 7 - telescopic supports, 8 - support plates, 9 - rotary rods for "aiming" the supports on the rails of the railway bed.

Author: DIMMI Created: 23.04.2013 13:35:08 Comments: 44 READ THE FULL ARTICLE

System S-500 / 55R6M Triumfator-M, complex 98Zh6M1 - SA-X-26

DATA AS OF 2017 (standard replenishment)
S-500 Prometheus / 55R6M Triumfator-M / Triumfator-MR system, 98Zh6M1 complex - SA-X-26
S-1000
NIR Samoderzhets system, NIR Vlastelin-TP
★★★

Anti-aircraft missile system for air defense and missile defense / long-range anti-aircraft missile system. The S-500 system is being developed by the State Design Bureau of the Almaz-Antey Air Defense Concern. In 2002, NPO Almaz prepared an engineering note on the creation of a 5th generation anti-aircraft missile system, and outlined the main performance characteristics of the system. Development of the appearance of the SAM began in 2003. In 2004, the preliminary design of the S-500 SAM began. In 2005, NPO Almaz completed work on a component of the Vlastelin research project and work on the Samoderzhets-A-A research project within the framework of the State Defense Order for 2005. In 2006, the Scientific and Technical Council of the Military-Industrial Complex under the Council of Ministers of Russia and the Board of Directors of the Almaz-Antey Air Defense Concern proposed to appoint the GSKB of the Almaz-Antey Air Defense Concern as the lead design bureau for the development of the S-500 5th generation air defense/missile defense system. On February 27, 2007, the Scientific and Technical Council of the Military-Industrial Complex under the Government of Russia approved the GSKB as the lead developer of the Unified Air Defense Missile Weapons System, which includes the S-500 air defense system as one of the components.

2008 GSKB Almaz-Antey carries out the 4th stage of the R&D project "Vlastelin-TP" ("Triumfator-Prometheus"), work is underway on the preliminary design of the product 97L6 R&D project "Vlastelin-TP".

2009 the development of the S-500 SAM system was announced in the media, and the development of working design documentation for the S-500 SAM system is underway. By order of JSC MKB Fakel in 2009 JSC Radiofizika carried out work on the component part of the R&D project "Triumfator-MR-RF". Stages 1 "Development of the technical design of product 77N6.1.R" and stage 2 "Prototyping of product 77N6.1.R" were carried out. The work was completed in 2010. In 2009, advance payments for the works were received in the amount of 13.698 million rubles, including 4.883 million rubles for stage 1 and 8.815 million rubles for stage 2 (source). By order of JSC GSKB Almaz-Antey and JSC Radiofizika, the active antenna array of the 77T6 multifunctional radar is being developed according to the MC R&D project Triumfator-AAR-1. At stage 1, a technical project was developed for the antenna array of the 77T6 product. The volume of work in 2009 in contract prices amounted to 52.790 million rubles. At the same time, JSC Radiofizika was working on the MC R&D project "Development, manufacture, adjustment and testing of a mock-up of an X-band AFAR fragment with optical power supply" code MC R&D project Triumfator-M "TA-256". In 2009, stages 1 “Development and production of a prototype of an X-band APAA fragment with optical power supply” and 2 “Configuration and testing of a prototype of an X-band APAA fragment with optical power supply” were completed. The work is being completed in 2010 (in 2009, an advance payment for stage 1 in the amount of 28.536 million rubles was received). By order of JSC GSKB Almaz-Antey, the development and manufacture of the 1TA120 subarray mockup is being carried out, as well as the manufacture of a test rig and testing of the subarray mockup (code SC ROC "Triumfator-MKT-F"). Under stage 1, the mockup of the antenna device based on an AFAR with feeder excitation for the 77T6 product and testing of the mockup units were carried out. Work has begun on stage 2 "Adjustment and testing of the mockup of the antenna device based on an AFAR with feeder excitation for the 77T6 product" (source).

2010 GSKB Almaz-Antey developed the technical design of the 55R6M air defense system and the technical design of the 98Zh6M1 missile complex, the possibility of developing a system with the required TTX, communication means for the air defense system were developed, control means were tested in a full-scale experiment. Also in 2010, a mock-up of the air defense missile system - products 77T6, 77N6-N and 77N6-N1 - was conducted, a MIMS (mock-up) of the main component of the system - the anti-aircraft missile system 98Zh6M1 was created, autonomous development of the software was conducted (*source - Annual report of GSKB "Almaz-Antey" for 2009-2010*).

The name SA-X-26 has not been officially confirmed.

Presumably the S-500 SAM launcher type 77P6-1 on the MZKT-792911 chassis (New Year's calendar of the Almaz-Antey Air Defense Concern for 2015 via Said Aminov, http://saidpvo.livejournal.com , processed by http://militaryrussia.ru).

Author: DIMMI Created: 20.07.2010 02:23:31 Comments: 161 READ THE FULL ARTICLE

9K37 Buk - SA-11 GADFLY

DATA AS OF 2017 (in progress)
9K37 Buk complex, 9M38 missile - SA-11 GADFLY
9K37M1 Buk-M1 complex, 9M38 missile - SA-11 GADFLY
9K37M1-2 Buk-M1-2 complex, 9M38 and 9M317 missiles - SA-11 GADFLY
★★★

Medium-range anti-aircraft missile system / SAM of the operational (army) level of air defense of ground forces. The complex was developed by the Tikhomirov Institute of Instrument Making. The chief designer of the SAM is A.A. Rastov.

The development of the complex to replace the troop-based Kub SAM was started by the Decree of the USSR Council of Ministers dated January 13, 1972, by almost the same composition of enterprises that created the Kub SAM:

- Research Institute of Instrument Engineering named after V.V. Tikhomirov (former OKB-15 GKAT):
  - the complex as a whole (chief designer A.A. Rastov);
  - command post 9S470 (lead designer G.N. Valaev, later - V.I. Sokiran);
  - self-propelled firing units 9A38 (lead designer V.V. Matyashev);
  - semi-active radar homing head 9E50 of the 9M38 missile (lead designer I.G. Akopyan);
- Research Institute of Measuring Instruments (NIIIP) MRP - detection and target designation station 9S18 "Kupol" (chief designer A.P. Vetoshko, later - Yu.P. Shchekotov);
- OKB Novator - missile 9M38 (chief designer L.V. Lyulyev);
- MKB "Start" (former OKB-203 GKAT) - launcher and loader unit 9A39 (chief designer A.I. Yaskin);
- OKB-40 of the Mytishchi Machine-Building Plant (MMZ) - chassis of the complex's equipment (chief designer N.A. Astrov);

Simultaneously with the creation of the SAM system for ground forces with the 9M38 missile, it was planned to create the naval SAM system M-22 "Hurricane".

Initially, it was planned to complete the development of the SAM system in the second quarter of 1975, but when it became clear that the task was somewhat more complicated than it seemed, it was decided to divide the development of the SAM system into two stages (by Resolution of the Council of Ministers of the USSR dated May 22, 1974):

- The first stage involved the development of the 9M38 SAM and the 9A38 self-propelled launcher and their inclusion as the 9K37-1 Buk-1 SAM system in the 2K12 Kub-M3 SAM system. It was planned to include one 9A38 self-propelled launcher in each Kub-M3 SAM battery. Joint testing of this SAM system was planned to begin in September 1974. In this configuration, the SAM system was called the 2K12M4 Kub-M4 and was accepted into service in 1978.
- The second stage involved the creation of the Buk SAM system itself, consisting of a 9S18 detection station, a 9S470 command post, a 9A310 self-propelled firing unit, and a 9A39 launcher and loader with 9M38 anti-aircraft guided missiles.

Tests of the 9K37-1 Buk-1 SAM system were conducted at the Emba test site from August 1975 to October 1976 as part of the 1S91M3 self-propelled reconnaissance and guidance system (SURN), the 9A38 self-propelled fire system (SOU), the 2P25M3 self-propelled launcher (SPU), with 3M9M3 and 9M38 missiles, and the 9V881 maintenance vehicle (MTO). Under the designation 2K12M4 Kub-M4 SAM system, the system was accepted into service with the USSR Ground Forces Air Defense in 1978. After the start of serial production, the new SAM system was delivered to the troops.

Joint tests of the Buk SAM system in full (without the Kub SAM system) were conducted at the Emba test site from November 1977 to March 1979. In 1980, the 9K37 Buk SAM system in full was accepted into service.

SAM 9K37M1. From left to right: command post 9S470M1, SOC 9S18M1 "Kupol-M1", self-propelled gun 9A310M1, PZU 9A39M1 and transport vehicle 9T229 on the KrAZ-255B chassis (photo by Leonid Yakutin, archive http://vpk-news.ru).

Author: DIMMI Created: 02.04.2017 20:39:32 Comments: 2 READ THE FULL ARTICLE

System S-400 / 40P6 Triumph, complex 98Zh6 - SA-21 GROWLER

DATA AS OF 2017 (standard replenishment)
S-400 (S-300PM3) "Triumph" / 40R6 system, 98Zh6 complex - SA-21 GROWLER
★★ Anti-aircraft missile system of object air defense / anti-aircraft missile system with detection, coordination and target designation means. Development

of the S-300PM3 / S-400 air defense system was started by NPO Almaz / GSKB Almaz-Antey (general designer - A. Lemansky) in the process of developing the S-300 air defense system family in 1986 (source). The system differs from previous generations in its greater capabilities in terms of the size of the air defense zone, types of targets hit, and ensures interaction with air defense systems of previous generations. The SAM uses missiles developed by the Fakel Design Bureau. Serial production of missiles for the S-300 and S-400 systems in 2010-2012 was carried out by MMZ "Avangard" (source). The S-400 "Triumph" system was accepted into service by the Decree of the Government of the Russian Federation on April 28, 2007 (source). The first missile division of the S-400 SAM system took up combat duty in the city of Elektrostal in the Moscow Region on August 6, 2007. The first combat firing of the 40R6 system as part of the 98Zh6 complex was successfully conducted at the Kapustin Yar test site in 2011. Exercises of combat crews of the 40R6 system are being conducted at the Ashuluk air defense test site. ★★

The 5P85T2 launcher of the S-400 Triumph air defense missile system during a parade rehearsal on Red Square in Alabino, 13.04.2012 (photo - Vitaly Kuzmin, http://www.vitalykuzmin.net).

Author: DIMMI Created: 11.10.2011 22:33:07 Comments: 376 READ THE FULL ARTICLE

Aurora system, complex 5Zh19 Argun - ABM-X-2

DATA AS OF 2017 (standard replenishment)
Aurora system, 5Zh19 Argun / 5Zh19P Argun-P complex, A-351 and A-900 missiles - ABM-X-2
5Zh19I Argun-I measuring complex
5N25 Istra / Argun radar
99Zh6 Ruza
radar 5N16E / 11P Neman-P radar
★★★

Project of the territorial multi-channel missile defense system / multi-channel firing complex (MCFC) "Argun" developed by OKB-30 G.V. Kisunko (NIIRP). In combination with a phased array radar and two types of anti-missiles, it was supposed to solve the problem of repelling a massive missile attack by ICBMs with MIRVed warheads. The development of the missile defense system began in 1964. According to the memoirs of G.V. Kisunko, the missile defense system project was not implemented due to the unattainability of 100% efficiency in recognizing real targets against the backdrop of numerous false ones at that level of technology development. The concept of the Aurora missile defense system envisaged, in the event of a massive strike by ballistic missiles using false targets, a long-range "clearing" strike by the A-900 anti-missile with a high-power nuclear warhead, followed by finishing off the identified real warheads with the A-351 all-altitude anti-missile (a modification of the A-350 missile of the A-35 missile defense system). The chief designer of the missile defense system was G.V. Kisunko , from November 1965 to 1975 - N.K. Ostapenko.

On November 5, 1965, the USSR Defense Council heard a report by G.V. Kisunko "On the premature development of a preliminary design for the construction of a territorial missile defense system for the country, operational in conditions of a massive attack by advanced ballistic missiles, on the topic of "Aurora" before the delivery of the A-35 to the USSR Ministry of Defense." As a result, Resolution of the USSR Council of Ministers No. 297-318 of November 5, 1965 was adopted on the creation of a preliminary design for the Argun range multi-channel firing complex as the second stage of the A-35 missile defense system . The Argun multi-channel firing complex was created as a development of the A-35 missile defense system for target and anti-missile channels. The main objectives of the range tests were to develop and verify the design principles and basic hardware solutions for the Argun multi-channel firing complex and the means included in it, as well as to evaluate its characteristics.

On May 3, 1967, the USSR Council of Ministers also adopted Resolution No. 387-144 on the creation of the Argun complex. The missiles were developed by the Fakel Design Bureau. The draft design of the Argun complex to ensure the reflection of an ICBM attack with MIRVed IR was proposed in the summer of 1967.

According to the memoirs of the first commander of the ABM and PKO troops, Yu.V. Votintsev (*source - Rubezhi*) In the summer of 1967, the Military-Industrial Complex Commission under the USSR Council of Ministers reviewed the draft designs for the Aurora missile defense system (G.V. Kisunko), the Don-2N multifunctional radar (A.L. Mintz), and the Neman radar (Yu.G. Burlakov). According to the design, the Aurora missile defense system was to include 4 Argun multi-channel firing complexes (MFSC) to be deployed near Moscow and Kuibyshev. The MFSC included a phased array target detection radar, a multi-channel anti-missile guidance radar, and long-range A-350R and A-900 anti-missiles. The design was criticized by the Customer (4th Main Directorate of the USSR Ministry of Defense) due to the impossibility of selecting targets in the exoatmospheric region during a massive strike by modern ICBMs. As a result, work on the project of the territorial missile defense system "Aurora" was closed in September 1967, and work on the MKSK "Argun" was continued. In 1967, N.K. Ostapenko was appointed chief designer of the "Argun" complex.

On the left is the 5N25 Istra/Argun radar of the Argun complex. On the right is the Ruza radar. The 38th site of the Sary-Shagan test site. Apparently the 1990s - early 2000s (http://www.atolkachev.ru/).

Author: DIMMI Created: 28.03.2010 16:38:38 Comments: 86 READ THE FULL ARTICLE

OKR Avantgarde

DATA FOR 2017 (in progress)
R&D "Avangard" / "Avangard-R"
★

Development of components for a promising intercontinental ballistic missile (ICBM). The development was carried out by the Moscow Institute of Thermal Engineering (MIT) jointly with the 4th Central Research Institute of the Russian Ministry of Defense. As of 2011, the development of the R&D "Avangard" (missile complex "Avangard-R" = "Rubezh") was completed and is in the preparation stage for flight tests (source). As of 2015, work on the R&D "Avangard" continues at the 4th Central Research Institute of the Russian Ministry of Defense within the framework of the large complex topic "Shlyambur" (source).

Due to the fact that the results of the development are used in the RS-26 Rubezh missile system , and also due to the name of the component part of the R&D project - Avangard-R - the Avangard R&D project is often associated with the Rubezh complex, and is sometimes called a "missile complex".

Author: DIMMI Created: 28.01.2017 00:39:08 Comments: 15 READ THE FULL ARTICLE

5th generation medium-range air defense missile system (project)

DATA AS OF 2017 (in progress)
5th generation medium-range air defense missile system (project)
★

Medium-range air defense missile system / operational (army) level air defense missile system of ground forces. The system is being developed by the V.V. Tikhomirov Institute of Instrument Making. The development of the air defense missile system was started in 2016 on an initiative basis using the Institute's own funds without a technical assignment from the Russian Ministry of Defense as part of work on the Buk-type air defense missile system line. This decision was approved by the Board of the Military-Industrial Complex under the Government of Russia. The air defense missile system is expected to be completed in 2023-2026.

On January 23, 2017, the General Director of the Research Institute of Anti-Virus, Yuri Bely, told the media: “The new complex is planned to further increase its noise immunity and survivability, automate and robotize combat assets, expand detection and destruction zones, increase the depth of integration into a single echeloned air defense system, or, in other words, the depth of support for the network-centric control system” (source).

Author: DIMMI Created: 23.01.2017 22:51:36 Comments: 1 READ THE FULL ARTICLE

Complex 42S6 Morpheus

DATA AS OF 2017 (standard replenishment)
Complex 42S6 "Morpheus"
★★★

Short-range anti-aircraft missile system / anti-aircraft missile air defense system. Development is carried out by GSKB of the Almaz-Antey Air Defense Concern. On February 27, 2007, the Scientific and Technical Council of the Military-Industrial Complex under the Government of the Russian Federation designated GSKB as the lead developer of the Unified Anti-Aircraft Missile Weapon System with the Morpheus short-range air defense missile system (the R&D project of the same name). The complex is not a military air defense system. In 2008, the development of a preliminary design was completed within the framework of the Morpheus R&D project. In 2009-2010. The technical design is being developed and plans have been announced for the SAM to be put into service with the Russian Armed Forces by 2015. In 2010, GSKB Almaz-Antey developed a set of working design documentation for a multifunctional radar (MFRR), manufactured individual finished MFRR devices and a command post, manufactured a prototype MFRR, and manufactured a chassis for the combat vehicle (source: GSKB Almaz-Antey Annual Report for 2009).

According to unconfirmed data, as of the first half of July 2011, the production of a prototype 70N6 combat vehicle was completed. In August 2011, the

media announced that the system would be accepted into service with the Air Defense Forces in 2013. There is also a possibility that the combat vehicle will be shown at the MAKS-2011 air show (it did not happen).

On April 24, 2013, Deputy Minister of Defense of the Russian Federation Colonel General Oleg Ostapenko announced in the media that the Morpheus ultra-low-altitude air defense system would be accepted into service in 2015.

Presumably, the failures in developing the system were one of the reasons for the reshuffle in the leadership of the Almaz-Antey Air Defense Concern in 2016.

ЗРС „Морфей" гипотетический вариант 1

ЗРС „Морфей" гипотетический вариант 2

ЗРС „Морфей" гипотетический вариант 1.1

ЗРС „Морфей" гипотетический вариант 1.2

Early hypothetical - sketches of options for presenting the PU 70N6 SAM 42S6 "Morpheus" with a rotating radar antenna and 24 SAM containers (c) 2010,

version from 22.06-23.07.2010, graphic processing and revision - Allocer.

Author: DIMMI Created: 18.06.2010 04:55:03 Comments: 311 READ THE FULL ARTICLE

S-350/50R6/50R6A Vityaz

DATA AS OF 2017 (standard replenishment)
S-350 / 50R6 / 50R6A Vityaz Complex / Vityaz-PVO R&D
Anti-aircraft missile system with air defense / medium-range anti-aircraft missile system. Developed by GSKB of the Almaz-Antey Air Defense Concern, chief designer - Ilya Isakov (*source - The latest ...*). Preliminary development of the complex to replace the S-300 SAM system was started by NPO Almaz in 1991-1993. The first mentions of the Vityaz SAM project date back to the MAKS-1999 air show, where models of combat vehicles of the complex on the KAMAZ chassis were demonstrated. Later, the models were shown at MAKS-2001. The complex is intended to replace the S-300P / S-300PM SAM system. The development of the Vityaz SAM system began in 2007 with plans to put it into service in 2012. The SAM system was created using developments from the export project of the KM-SAM SAM system, designed by the Almaz-Antey State Design Bureau for South Korea. In 2009-2011, the Almaz-Antey State Design Bureau conducted the Vityaz-PVO R&D project. In 2010, the development of design documentation began, and the completion of the design documentation was planned for 2011 (source: Noveyushaya...). In 2010, GSKB Almaz-Antey completed the development of working design documentation for a combat control post and a multifunctional radar, manufactured a prototype of a combat control post, individual complete devices for combat control posts (CCP) and a multifunctional radar, conducted equipment docking and autonomous testing of a prototype CCP (source - Almaz-Antey GSKB Annual Report for 2009). In 2011, the Almaz-Antey Air Defense Concern completed the development of software and algorithmic support for the 50N6A multifunctional radar of the 50K6A combat control post of the 50R6 complex, completed the equipment of the V-100 container from the V-1 antenna post, and equipped the V-20 chassis from the 50N6A radar (Almaz-Antey Air Defense Concern, source - Annual Report 2011). In 2012, work was carried out to manufacture a prototype of the multifunctional radar, to develop a prototype of a specialized launcher, and to prepare the 50R6A system for preliminary and state tests (Almaz-Antey Air Defense Concern, *source - Annual Report 2012*). In 2013, the Almaz-Antey Air Defense Concern manufactured prototypes of a specialized launcher and a multifunctional radar for the S-350 air defense missile system (Almaz-Antey Air Defense Concern, *Annual Report for 2013*). The prototype of the Vityaz 50R6A air defense missile system is in ★★★

The 50P6A self-propelled launcher, the 50N6A multifunctional air target detection radar vehicle and the 50K6A combat control post were first publicly demonstrated at the Obukhov Plant (St. Petersburg) on June 19, 2013. Serial production of the system will be carried out in the North-West Regional Center of the Almaz-Antey Air Defense Concern, in particular at the Obukhov State Plant and the Radio Engineering Equipment Plant .

Tests . Field tests of the prototype SAM system were planned to begin in 2011, but according to data from the end of 2010, production of the prototype is planned for 2012 and its tests are planned to be completed in 2013. Deployment of the SAM system is planned to begin in 2015 (2010 plans). In mid-2013, it was reported that the complex would begin full-scale testing in 2014 (*source - Noveyushaya...*). Although earlier, in June 2013, it was reported that the SAM tests were to begin in the fall of 2013 (source).

In January 2012, the media reported that more than 30 Vityaz SAMs would be delivered to the Russian Air Defense Forces by 2020, which are planned to replace the S-300P/PS SAMs. Presumably, the Vityaz SAM can use two types of missiles - short-range (presumably 9M100) and medium-range (presumably 9M96). According to the Air Force Commander-in-Chief, Colonel General Alexander Zelin, it is assumed that the Vityaz SAM will have several times the combat capabilities of the S-300P SAM. In February 2012, the media announced that 38 divisional SAM systems were planned to be accepted into service.

On September 11, 2013, the head of the Almaz-Antey State Design Bureau, Vitaly Neskrodov, told the media that tests of the S-350 SAM system were planned to be completed in 2014, serial production would begin in 2015, and deliveries of the SAM system to air defense units would begin in 2016. The Vityaz air defense system should replace the famous S-300PS and S-300PM (PMU) in the Russian army.

Self-propelled launcher 50P6E of the S-350E "Vityaz" system, on the left - radar 50N6E. MAKS-2013 Air Show, Ramenskoye, 27.08.2013 (photo - Vitaly Kuzmin, source).

Author: DIMMI Created: 23.01.2012 21:31:49 Comments: 63 READ THE FULL ARTICLE

48Я6-К1 Podlet-K1

DATA AS OF 2016 (in progress)
48Ya6-K1 "Podlet-K1"

Mobile low-altitude radar system for detecting aerodynamic and ballistic objects. The system was developed by the Almaz-Antey Air Defense Concern. A prototype was developed in 2009 (Almaz-Antey Air Defense Concern, *source: Annual Report for 2009*). Testing of the prototype radar began in 2010. The first deliveries of the Podlet-K1 radar to the Air Defense Forces began in 2015.

Radar complex 48Ya6-K1 "Podlet-K1" (http://www.russianarms.ru/).

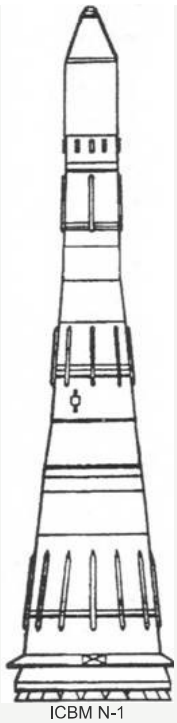
Author: DIMMI Created: 17.12.2016 13:07:27 Comments: 2 READ THE FULL ARTICLE

N-1 / object N (project)

DATA AS OF 2016 (in progress)
Rocket N-1 / "Carrier-1" / object "N" (project)

Project of a super-heavy intercontinental ballistic missile (ICBM). The rocket was developed by OKB-1 (General Designer - S.P. Korolev) in accordance with the Resolution of the USSR Council of Ministers No. 715-296 of June 23, 1960 (submitted for consideration on April 30, 1960) "On the creation of powerful launch vehicles, satellites, spacecraft and the exploration of outer space in 1960-1967". The resolution set the task of developing in 1960-1963 the N-1 launch vehicle with a liquid-propellant rocket engine (object "N"), which could put 40-50 tons of payload into near-Earth orbit and 10-20 tons of payload into interplanetary orbit. The decree provided for the development of a more advanced launch vehicle on its basis in 1963-1967 - the N-II rocket (launching a 60-80 ton payload into low Earth orbit and 20-40 tonnes into an interplanetary trajectory) with nuclear rocket engines on the 2nd and subsequent stages. The decree also tasked the USSR Ministry of Defense to prepare proposals for the military use of space objects and the N-1 launch vehicle in the third quarter of 1960.

According to memoirs, the idea of a super-heavy three-stage N-1 rocket arose in Sergei Pavlovich Korolev in 1956. In various sources, the name is deciphered as "Carrier-1" and as "Science-1". On July 15, 1957, the first proposals for the rocket were presented by Korolev to the Council of Chief Designers. The Resolution of the Council of Ministers of June 23, 1960 (see above) was the first Resolution on the development of the rocket. On May 13, 1961 and April 13, 1962, the second and third Resolutions of the USSR Council of Ministers were issued, which specified the design tasks and deadlines. On September 24, 1962, the USSR Council of Ministers issued a Resolution on the creation of the N-1 launch vehicle for sending an expedition to the Moon (source).



ICBM N-1

Author: DIMMI Created: 04.05.2015 13:02:59 Comments: 5 READ THE FULL ARTICLE

BMD-4 / BMD-4M

DATA FOR 2016 (standard update)
BMD-4 / object 960 "Bakhcha-U"
BMD-4M / "Gardener"
★★★

Airborne combat vehicle. The BMD-4 Bakhcha-U was developed by the Special Design Bureau of the Volgograd Tractor Plant jointly with the State Unitary Enterprise Design Bureau of Instrument Engineering (Tula) during the modernization and using the chassis of the BMD-3 Bakhcha. The Bakhcha-U weapons module was developed by the Design Bureau of Instrument Engineering based on the BMP-3 weapons module . The BMD-4 was accepted into service with the Russian Airborne Forces on December 31, 2004. The first batch of BMD-4 entered service with the 137th Guards Parachute Regiment of the 106th Guards Airborne Division in August 2005. Serial production of the BMD-4 was carried out at the Volgograd Tractor Plant.

In connection with the bankruptcy of the Volgograd Tractor Plant, the Kurganmashzavod SKB and for further production by the Kurgan Machine-Building Plant in 2007 developed a modification of the BMD-4M - the vehicle is unified in hull with the BMP-3 , but uses the same Bakhcha-U weapons module as the BMD-4. The prototype BMD-4M was first demonstrated at the Kurganmashzavod proving ground on March 21, 2008. In 2008, it was planned to conduct joint tests, based on the results of which the vehicle was planned to be accepted into service. Serial production was planned to begin in 2009, and during 2010 the Airborne Forces expected to receive the first 10 BMD-4M for military tests.

In April 2010, First Deputy Minister of Defense V.A. Popovkin stated that BMD-4M, except for the batch for testing, had not been delivered to the Airborne Forces and the Ministry of Defense was refusing to purchase them further. Later, in the fall of 2012, after the change in the leadership of the Ministry of Defense, plans were announced to deliver 10 vehicles to the Airborne Forces in 2013 for state testing. And on December 8, 2012, a statement appeared in the press from the commander of the 31st Guards Separate Airborne Assault Brigade of the Airborne Forces, Colonel Gennady Anashkin, that the BMD-4M had been accepted into service. A contract for the delivery of the first 10 BMD-4s for the amount of 608 million rubles was concluded with Kurganmashzavod, the delivery date was November 2013, but on April 23, 2013, information appeared in the media about this. that the number of BMD-4Ms supplied will be reduced to 7 units due to the increase in the cost of each vehicle by almost 20 million rubles - this is due to the transfer of chassis production to Kurganmashzavod (source).

In May 2016, information appeared in the media that the BMD-4M "Sadovnitsa" had been accepted into service by the Airborne Forces of the Russian Armed Forces. It was planned to receive 144 vehicles in 2016 (source).

BMD-4, 2007-2010 (photo - Nikolay Donyushkin, http://ria.ru).

Author: DIMMI Created: 10.09.2011 17:46:28 Comments: 7 READ THE FULL ARTICLE

Grom / Sapsan / Grom-2 (projects, Ukraine)

DATA FOR 2016 (standard update)
Complex "Thunder" (project)
Complex "Sapsan" (project)
Complex "Thunder-2" (project)
★★★

Multifunctional missile complex / modular missile system. The national missile complex "Sapsan" has been developed by the Yuzhnoye Design Bureau (Dnepropetrovsk) jointly with the National Space Agency of Ukraine since 2007. The chief designer of the complex as of 2012 is Alexander Pavlovich Kushnarev (source). The decision to create a national operational-tactical complex was made by the Security Council of Ukraine in 1997. When creating the complex, it is likely that the developments of the first national project OTR "Borisfen" (Yuzhnoye Design Bureau, 1994, range up to 500 km, development ceased in 2003) were used. It is also most likely that the project of the OTR "Grom" complex, proposed by the Yuzhnoye Design Bureau for export deliveries in the 1990s, was used in the development of the project.

The technical specifications for the creation of the Sapsan complex were issued by the Ministry of Defense of Ukraine by the end of 2006. According to the initial plans, the development of the Sapsan complex was planned to be completed in 2011, but by 2010, 7 million USD had been spent on the development, after which funding for the project was stopped. According to the media, the 2010-2011 project for the complex involves combining an operational-tactical missile complex and a tactical-range MLRS in a single system and on a single SPU. In addition, in 2007-2009, the media discussed the configuration of the complex with a cruise anti-ship missile and anti-aircraft missiles.

Modern version of the SPU of the Grom-2 missile system, 2016 (UKRSPETSEXPORT brochure, processed).

Author: DIMMI Created: 21.10.2011 16:20:24 Comments: 20 READ THE FULL ARTICLE

15U70 / product 102

DATA AS OF 2016 (in progress)
Product 15U71 / 102 / 102E
★★

Guided warhead of an ICBM. The development of the apparatus under the theme "102" was carried out by "NPO Mashinostroyeniya" (Reutov) jointly with the program for developing guided warheads " Albatross " or in parallel with it.

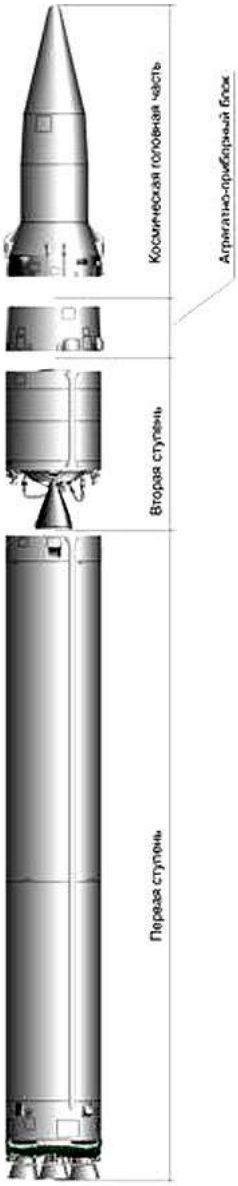
Assembly of prototypes of "product 102-E" as of 2010 is carried out by the pilot production of NPO Mashinostroyeniya (including the non-metal workshop - workshop No. 17, source) and is considered one of the most important tasks at the enterprise (source).

Testing. In order to ensure testing of low-flying targets, by order of the USSR Minister of Defense dated February 20, 1987 and by order of the Commander-in-Chief of the Strategic Missile Forces dated June 20, 1988, the IP-10 measuring point (military unit 21252) in Mirny (Yakutia) was deployed on the basis of the Purga measuring equipment complex. The unit was redeployed to Mirny in June-August 1990 to ensure testing of "product 102" (source). The IP-10 observation point was closed due to the closure of the testing program by directive of the First Deputy Minister of Defense of Russia dated April 4, 1997 (source).

In 2005, the Center for Operation and Testing of Missile Complexes of the Center for Experimental and Testing of the Rocket Complexes of the Republic of Kazakhstan was created as part of the Representative Office of NPO Mashinostroyeniya at the Baikonur Cosmodrome. It was tasked with preparing and launching RS-18 ICBMs on the topics of Zaryadye, 102E, and Kondor (source). As of 2010, the Department of Telemetry Processing of Information of NPO Mashinostroyeniya processes telemetry information obtained during the tests of "product 102" (source).

The name of the apparatus 15U70 and its identification with "product 102" is taken from Western sources .

All data on the complex are presumptive and taken from open sources and the media. The list of sources is attached.

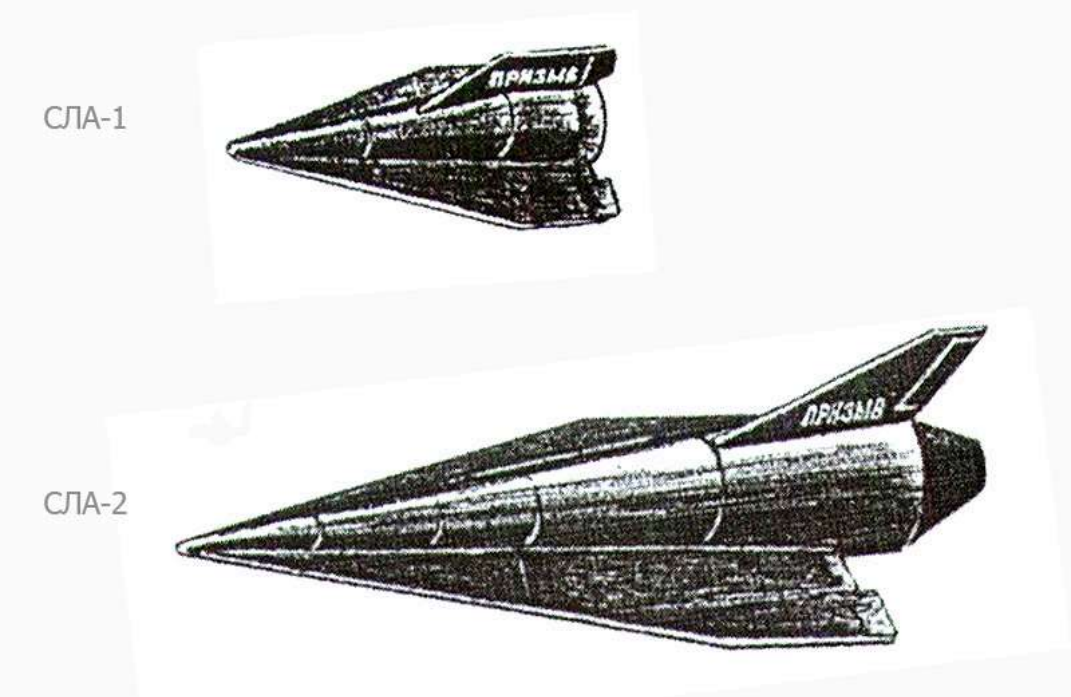


Launch vehicle "Strela" based on ICBM 15A35 / UR-100UNTKH (http://www.npomash.ru/).

Author: DIMMI Created: 09/16/2016 22:42:45 Comments: 5 READ THE FULL ARTICLE

15P170 Albatross

DATA FOR 2015 (standard update)
Research and development work "Albatross", 15P170
Intercontinental ballistic missile (ICBM) complex. The complex was developed by NPO Mashinostroyeniya (Reutovo) in accordance with the Resolution of the USSR Council of Ministers No. 173-45 of February 9, 1987. Chief designer - Gerbert Efremov. In 1991, it was planned to begin testing the complex, and in 1993, it was supposed to begin serial production of the ICBM (source - Kazydub). The creation of a new missile complex with the ability to overcome a multi-echelon missile defense system was to become an asymmetric response to the development of a missile defense system in the United States under the SDI program. The combat equipment of the complex is maneuvering gliding (winged) hypersonic warheads of the first generation (source), capable of maneuvering up to 1000 km in azimuth upon entering the atmosphere at the altitude of the "Karman line" with speeds of about 5.8 - 7.5 km / s (17-22 M). The Albatross project was based on proposals for a controlled warhead capable of performing an evasive maneuver from an interceptor missile - the UBB was supposed to record the launch of the interceptor missile and perform a programmed evasive maneuver. The development of the UBB project with such capabilities was carried out in 1979-1980 - the design of the automation system for such an anti-missile maneuver was carried out (source). The preliminary design of the Albatross complex was developed by the end of 1987 and drew criticism from the Ministry of Defense. The design of the complex was carried out until the beginning of 1989. The main reasons for the termination of development: dubiousness of the project implementation deadlines, incl. due to the problematic nature of the technical solutions incorporated into the project. In June 1989, at a meeting at the NPO Mashinostroeniya (Reutovo), the NPO's general director G.A. Efremov proposed developing the Albatross complex as a universal complex for the Strategic Missile Forces - for silo and mobile basing types. This caused opposition from other ICBM developers - the Moscow Institute of Thermal Engineering (MIT) and the Yuzhnoye Design Bureau (Dnepropetrovsk). On September 9, 1989, in development of the Resolution of the USSR Council of Ministers of February 9, 1987, Decision of the Military-Industrial Commission No. 323 was issued, which prescribed the creation of two new missile systems instead of the Albatross complex - a mobile ground-based and a stationary silo-based based on a three-stage solid-fuel missile, universal for both complexes, developed by MIT for the Topol-2 mobile ground-based complex. The research project was named "Universal" (the RT-2PM2/8Zh65 missile, later - "Topol-M"). The development of the PGRK with the new missile was carried out by MIT, the complex based in the silo - by the Yuzhnoye Design Bureau (history - Kazydub). Active development of the Albatross complex in the interests of the Strategic Missile Forces was stopped after the conclusion of the START-1 Treaty in 1991, but testing of the UBB prototypes continued. ★★★



Drawing of the SLA-1 and SLA-2 aircraft of the Prizyv system from an advertising brochure of NPO Mashinostroeniya, 1990s (http://forums.airbase.ru/).

Author: DIMMI Created: 11.08.2015 07:40:47 Comments: 3 READ THE FULL ARTICLE

2K10 Ladoga / 3M2 missile

DATA FOR 2016 (standard update)
Complex 2K10 "Ladoga", missile 3M2 - 2-stage
Complex 2K10 "Ladoga", missile 3M3 (?) - 1-stage
★★

Front-line guided ballistic missile. The solid-fuel missile with a mobile start was developed by SKB-172 (Perm), chief designer M.Yu. Tsirulnikov.

In the period from 1956 to 1958, SKB-172 carried out the first research and development work on the development of various design options for an operational-tactical missile with a mobile start with various propulsion systems (liquid, solid fuel). For the first time in domestic rocket engineering, the rocket engine body was made of high-strength steel 1 mm thick, but with a winding made of composite materials. Almost all subsequent developments in this area were carried out with the maximum use of composite materials (source).

The development of the Ladoga missile system was initiated by Resolution No. 189-89 of the USSR Council of Ministers dated February 13, 1958, on the development of a "rocket system for ground forces with solid-fuel guided missiles" "Ladoga" and " Onega ". According to the Resolution of the USSR Council of Ministers, the missile was planned to be submitted for test flights in the 3rd quarter of 1960. Initially, the missile was designed as a two-stage missile.

The first stage of flight tests was conducted in 1960 at the Kapustin Yar test site. During the first four launches with a functioning control system, the missile was destroyed before the end of the second stage engine operation. At the end of 1960, it was decided to abandon the two-stage scheme in favor of one stage. An experimental batch of missiles and an experimental launcher were manufactured by the Petropavlovsk Machine-Building Plant on the ZIL-135L chassis. Drop tests of the single-stage version began in April 1961. The first three controlled launches were conducted in July-September 1961 - in all three launches, the missile was destroyed in the active section of the trajectory due to loss of stability and destruction of the engine nozzle. Engine (nozzle) modifications - late 1961. A pilot batch of 12 missiles with a new nozzle were built at Plant No. 172 in early 1962. Tests were conducted in the first half of 1962 - large dispersion was noted, which was probably a consequence of unsatisfactory operation of the control system. Work on the missile was stopped "as an unpromising product" by Resolution of the USSR Council of Ministers No. 231-113 of March 3, 1962.

SPU of the Ladoga complex on the MAZ-535B chassis at the Kapustin Yar proving ground (photo from http://www.russianarms.ru)

Author: DIMMI Created: 28.03.2009 23:27:50 Comments: 7 READ THE FULL ARTICLE

K-300 Bastion - SSC-5 STOOGE

DATA FOR 2016 (standard update)
K-300P "Bastion-P" complex (mobile), K-310 / 3M55 - SSC-X-5 / SSC-5 STOOGE missile
K-300S "Bastion-S" complex (stationary)
★★★

Coastal anti-ship missile system with a supersonic unified cruise missile 3M55 "Onyx" / "Yakhont" . Development of the ground-based system was started in the first half of the 1990s by NPO Mashinostroyenia (Reutov). The project of the mobile system "Bastion" of the mid-1990s assumed the placement of the SPU with three missiles in a TPK on a MAZ-543 chassis. The design of the SPU was initially developed, apparently, by the Central Design Bureau "Titan" (Volgograd). The battery of systems was supposed to include 4 SPUs, a combat control vehicle, control equipment and, optionally, a helicopter target designation system. In the mid-2000s, the media featured a version of the SPU on the MZKT-7930 "Astrolog" chassis with three transport and launch cups (TPK), resting on a jacked up platform during launch. The exact developer of the SPU version is unknown. By 2008, a combat vehicle / SPU on the MZKT-7930 Astrolog chassis was created with two transport and launch cups placed in the transport module, which rest on the ground during missile launch. The developer of the combat vehicle (SPU) is Technosoyuzproekt LLC (Belarus). The general concept of the use of the complex and the infrastructure were preserved in the original design form.

State tests of the complex were completed in the area of Cape Zhelezny Rog (Taman), probably in October 2010 (source , source). The complex was accepted into service by the Russian Armed Forces in 2010. Serial production of the Onyx (for the Russian Armed Forces) and Yakhont (for export) missiles is carried out by NPO Strela (Orenburg).

SPU K-340P of the K-300P "Bastion-P" complex in the launch position (Annual report for 2014 NPO Mashinostroyeniya, Reutov).

Author: DIMMI Created: 21.09.2012 04:20:09 Comments: 35 READ THE FULL ARTICLE

KN-09 (DPRK)

DATA FOR 2016 (standard update)
KN-09
★★★

Tactical missile / guided missile MLRS. Testing of the KN-09 missile type has been underway, apparently, since 2013. Probably, in mid-2014, the missile was accepted into service by the DPRK army after a series of test launches. It is highly likely that both Russian and Chinese technologies and solutions were used in the work on the missile.

Launch of a KN-09 missile from a self-propelled launcher. DPRK, 2015-2016 (source).

Author: DIMMI Created: 10.07.2014 22:48:20 Comments: 9 READ THE FULL ARTICLE

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